



LtCol Chris McClernon, PhD

Director

werc@usafa.edu

"Developing tomorrow's leaders with today's warfighter research"

Distribution A: Approved for public release, distribution unlimited



WERC Research

WARFIGHTER SUPPORT



TECHNOLOGY TRANSFER



FACULTY DEVELOPMENT



CADET EDUCATION



WERC Overview

■ Mission

- Facilitate faculty and cadet research in the Behavioral Sciences through collaborative efforts to enhance warfighter effectiveness

■ Priorities

1. Enable the warfighter
2. Facilitate faculty & cadet research
3. Establish & maintain a world-class Beh Sci research facility
4. Be the AF's model for efficient, effective, affordable warfighter research





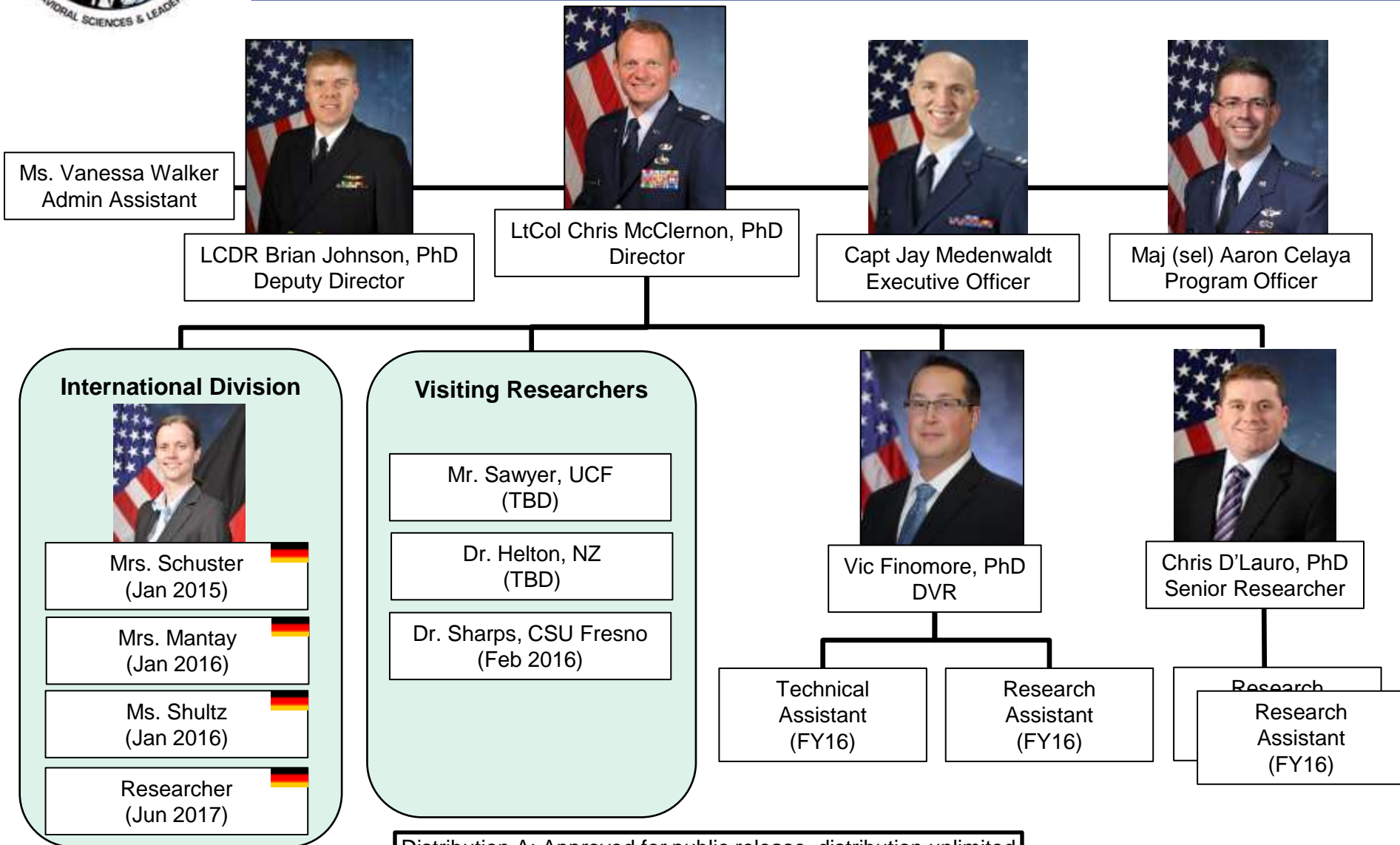
AY14/15 In Review

- 8 Staff
- 39 Faculty/researchers
- 262 Students
- 5 Dedicated research labs
- Hosted 8 Brown Bags
- Dr. Endsley Visit
- Dr. Zacharias Visit
- AFOSR Trust & Influence Program Review
- Internal WERC Program Review
- \$707k Budget
- 40+ Publications/ presentations
- Sponsored 20+ research TDYs



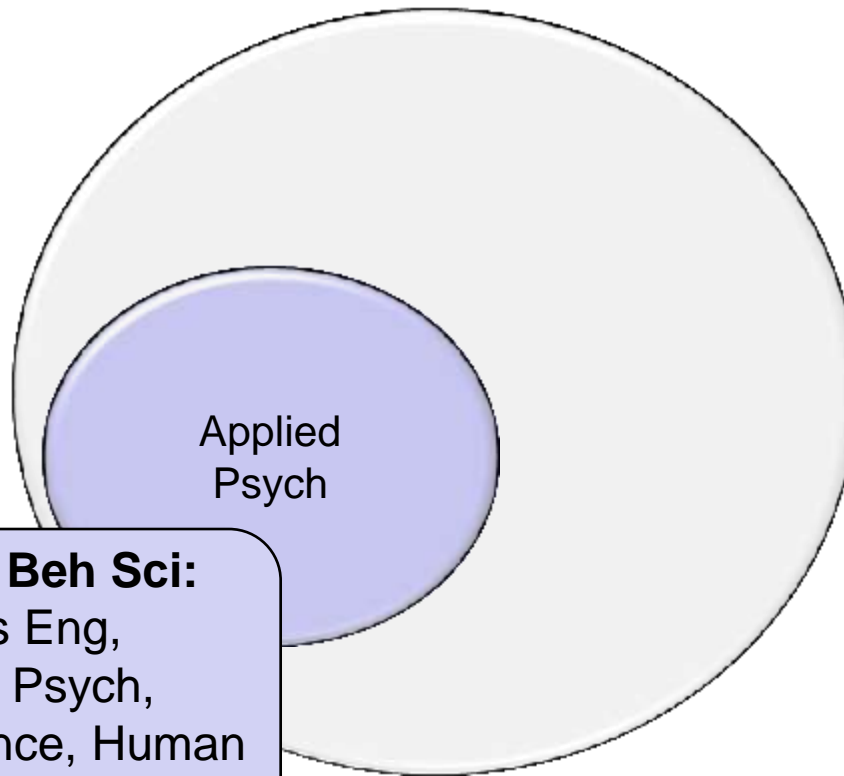


WERC Team (CY2015)





Research Themes



Applied topics in Beh Sci:

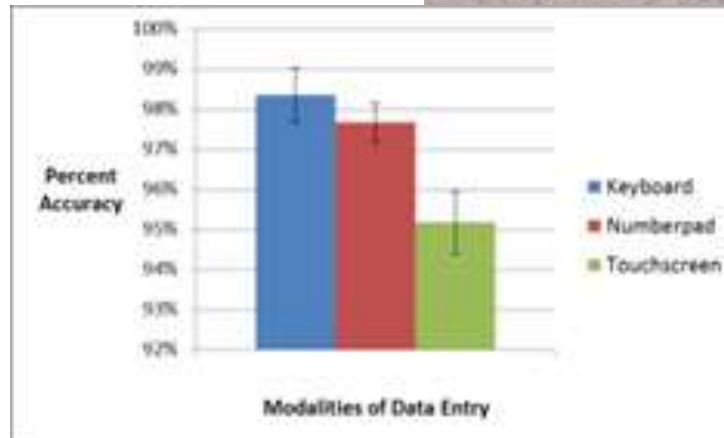
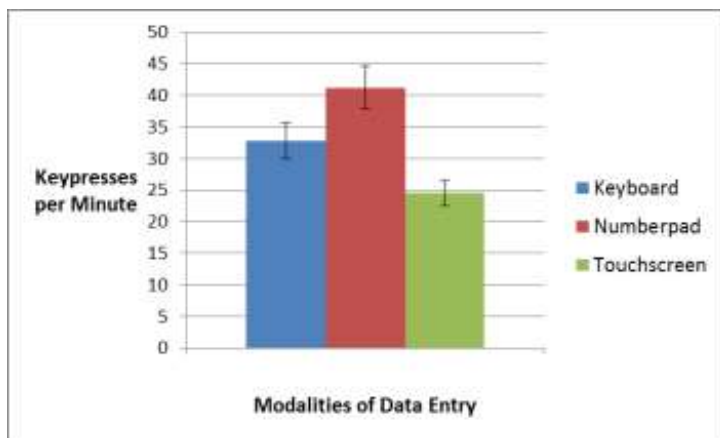
Human Factors Eng,
Leadership, Eng Psych,
Cognitive Neuroscience, Human
Systems Integration



MQ-9/X Interface Design

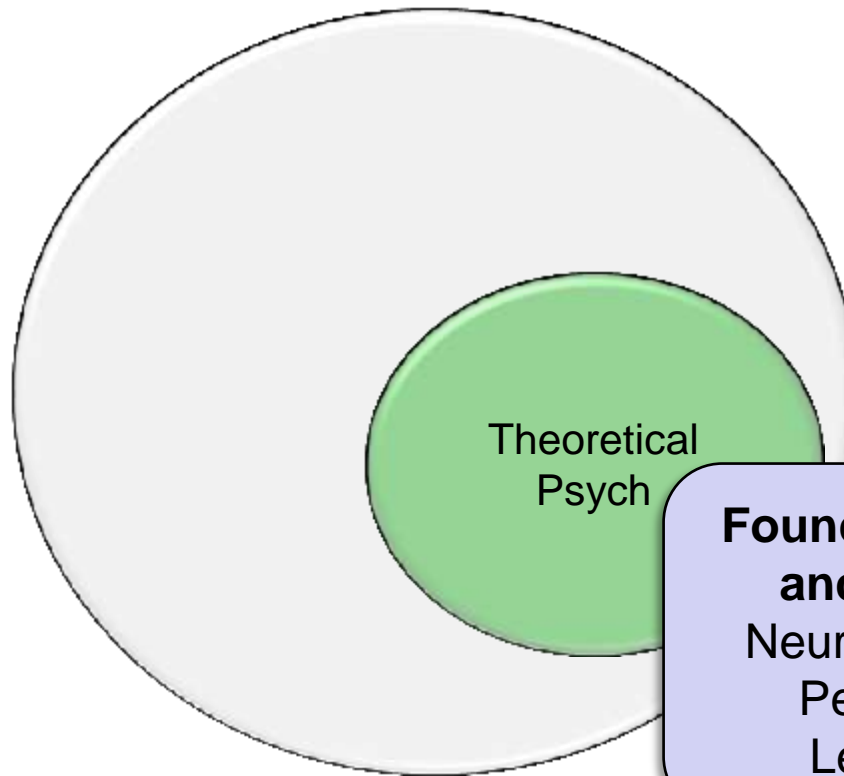
(PI: LtCol McClernon, Dr. Vic Finomore)

- Collaborating with AFLCMC, General Atomics, MQ-9/X SPO
- Investigating data entry for advanced systems
- Met with CET at General Atomics
- Conducted testing on MQ9/X Block 50 GCS
- Laboratory study to test data entry method





Research Themes



**Foundations of psychology
and/or basic research:**
Neuroscience, Sensation &
Perception, Cognition,
Learning, Personality



Mental Health of Embedded RPA Families

(PI: Ms. Michaela Schuster, Dr. Wil Scott)

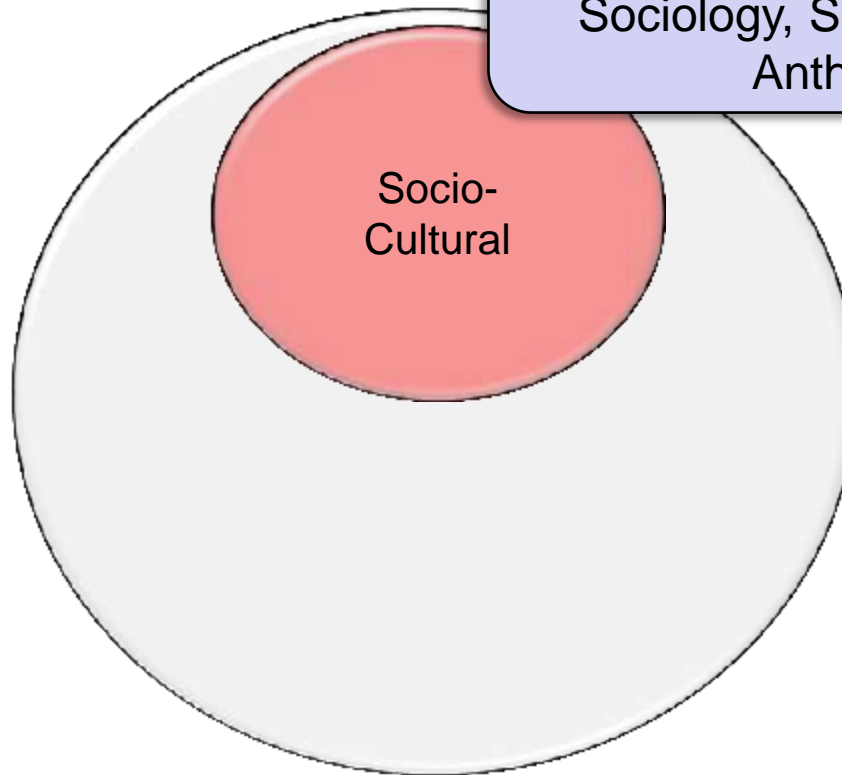
- Collaborating with AFRL (Dr. Wayne Chappelle), Creech AFB, Cannon AFB, German Air Force
- Investigating the impact of RPA combat operations on co-located family members
- Methods developed (on-line and phone interviews)
- IRB pending





Research Themes

**Social thinking/research within
DoD operations/issues:**
Sociology, Social Psychology,
Anthropology





RPA Field Simulation

(PI: Dr. Wil Scott, Dr. Karen DeAngelis)

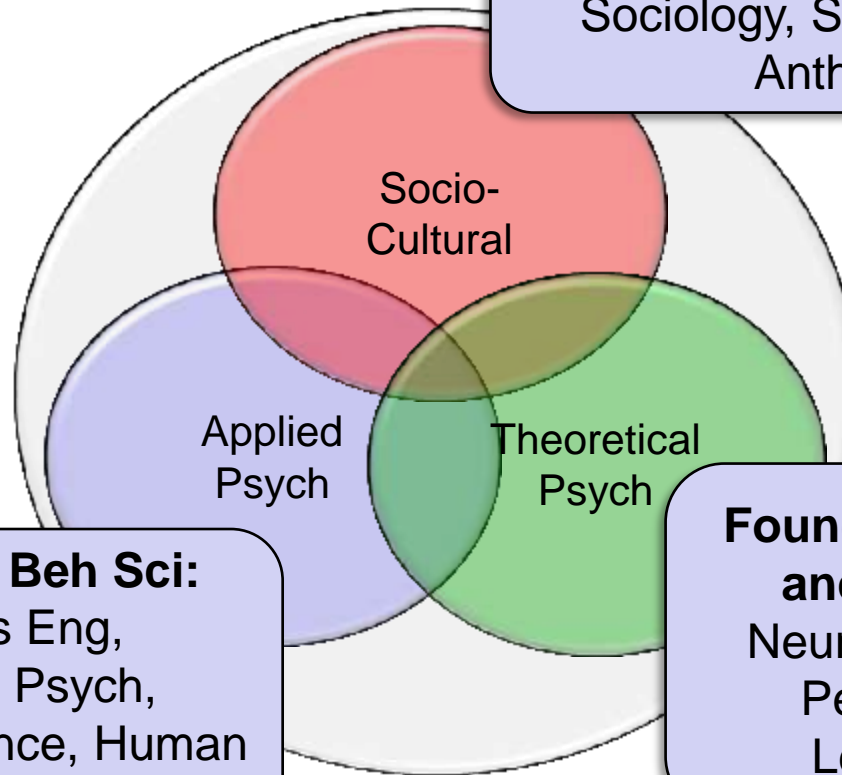
- Collaborating with SOCOM, AFA UAV Center
- Behavioral Sciences & Leadership Capstone research project
- Field teams enact challenging legal/ethical dilemmas in irregular warfare setting (Afghanistan)
- Action recorded by RQ-11 Ravens flying overhead
- Video transmitted to AOC team who must make mission-compatible shoot/no-shoot decisions in real-time



Distribution A: Approved for public release, distribution unlimited



Research Themes



Social thinking/research within DoD operations/issues:
Sociology, Social Psychology, Anthropology

Applied topics in Beh Sci:
Human Factors Eng,
Leadership, Eng Psych,
Cognitive Neuroscience, Human
Systems Integration

Foundations of psychology and/or basic research:
Neuroscience, Sensation &
Perception, Cognition,
Learning, Personality



Questions?

werc@usafa.edu



RPA Impacts on Military Families

(Schuster & Scott)

Research Objectives:

RPA assignments generate stress because of the nature of the work, the “deployment-in-place,” characteristic, and, at Creech AFB, lack of on-base services; study is designed to ...

- assess how RPA family members are doing
- provide recommendations for improving programs/support services

Technical Approach:

- Spouses/partners of those in RPA crews/units may access anonymously an Air Force maintained Survey Monkey site to fill out a quantitative questionnaire
- Those who wish may sign up for a follow-up telephone interview

Key Findings:

None yet, survey/interviews commence 17 August 2015

Benefits to wider academic or DoD community:

- Potential to improve how RPA assignments are conceptualized and distributed with an eye toward improving moral and family/relationship satisfaction
- Potential to tailor available programs/support services to improve duty performance and family well-being



RPA Field Simulations

(Scott, DeAngelis, & Kajdasz)

Research Objectives:

- To devise “dilemma training” scenarios to acquaint cadets with legal/ethical issues involving RPAs in irregular warfare settings
- To create initial assessments for evaluating the fidelity and effectiveness of “dilemma training” scenarios
- To generate recommendations for conducting mission-effective “dilemma training” scenarios that may be of use in the operational Air Force

Key Findings:

- AOC team had difficulty translating classroom solutions into quick, legal/ethical decisions in real-time
- Visual/auditory cues affected decision-making
- Recommendations include need for:
 - staging scenarios more effectively, perhaps use of “drama coach” for rehearsing future scenarios
 - gimbal-mounts for Raven’s cameras to improve video-feeds to offset weather conditions

Technical Approach:

- PI, Co-PI, and senior cadets prepared scenarios/ROEs enacted in the field and recorded by RQ-11 Ravens, with video-feed transmitted to an AOC team for challenging “shoot-no shoot” decisions
- Video-recordings of activities “on the ground” and in the AOC are in process of being synchronized for use in further studies

Benefits to wider academic or DoD community:

- PI, Co-PI prepared position paper/research report to explain theoretical thinking and practical steps for RPA Field Simulations
- Paper/research report circulated among colleagues who study RPA issues in military sociology, military psychology
- Human performance team in operational Air Force has expressed interest in such simulations for improving training of RPA operators



Command & Control Digital Checklist

(McClernon & Finomore)

Research Objectives:

- Current NORAD/NORTHCOM Command & Control operations are conducting using a spiral bound paper checklist
- Determine the feasibility of conducting crisis-response C² activities with the aid of a digital checklist

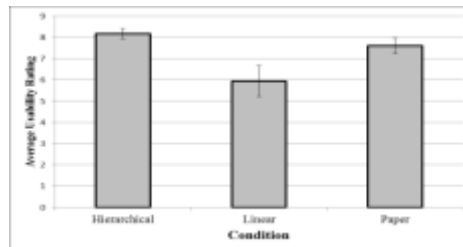
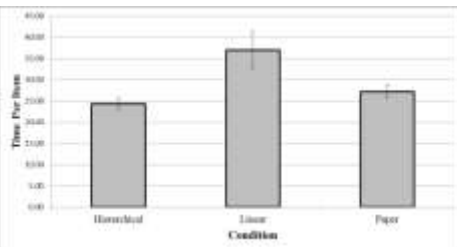


Technical Approach:

- Phase 1: Empirically test/compare paper vs. digital checklists for cadet command center checklist
- Phase 2: Develop NORAD/NORTHCOM digital checklist to replace existing paper checklists
- Phase 3: Test/compare new digital checklist to legacy checklist

Key Findings:

- Cadet command center digital checklist was (1) more efficient, and (2) resulted in few error compared to traditional paper checklists



Benefits to wider academic or DoD community:

- Introduce modern computer-based systems for current military operations and crisis response to improve performance and efficiency
- Test similar digital tools for other military contexts (e.g., aviation, dismounted, nuclear, etc.)



Data Entry Methods in Unmanned Aerial Vehicle Operations (McClernon & Finomore)

Research Objectives:

- Proposed UAV Ground Control Stations (GCSs) incorporate touch-screen displays for data entry
- Test feasibility of touch-screen displays for UAS operations



Figure 1. Advanced Cockpit GCS



Figure 2. Current Cockpit GCS

Technical Approach:

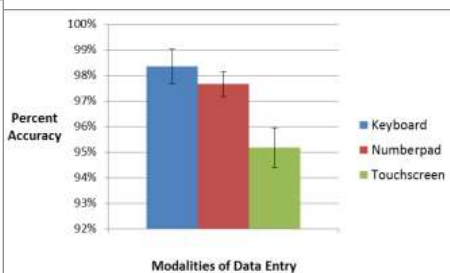
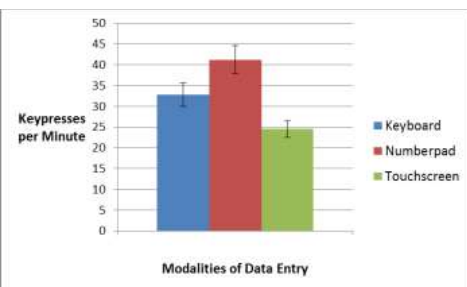
- Test data entry performance while flying a military flight screening multi-task simulation (MATB)
- Then test similar task in an operationally-relevant GCS



Figure 3. Participant performing the data entry and MATB task

Key Findings:

- When comparing keyboard, number pad, and touchscreen input devices, the touchscreen resulted in less efficient data entry, poorer accuracy, and lower performance on the primary MATB task.



Benefits to wider academic or DoD community:

- Anecdotal evidence reveals that the RPA community is resistant to using touchscreen displays for data entry
- Empirical evidence now suggests primary task and data entry performance also suffers from touchscreen displays
- Need to test in an operational GCS with a flying task